Review Sheet Chapter 17 Thermochemistry Mrs Sanford Name:

Thermochemistry-

Chemical potential energy-

Heat-give symbol and units-

Heat flows from_____ to _____.

System: Surroundings:

Exothermic: Endothermic:

Heat Capacity Units:

Specific heat: Formula: Units:

Calorimeter:

Two types of calorimeters are:1- 2-
(Simple calorimeter) (Bomb calorimeter)

Formula for Simple calorimeter: Formula for Bomb calorimeter:

A thermochemical equation is an equation that:

Represent an **exothermic** reaction with the energy term 1- written in the equation
2- Written beside the equation AND 3- as a potential energy diagram

1-
2-

3.

Represent an endothermic reaction with the energy term 1- written in the equation
2- Written beside the equation AND 3- as a potential energy diagram

1-
2-

3.

Sketch of heating curve with labels of enthalpy and specific heat. Also include kinetic and potential energy.

When do you use table 17.1?

When do you use table of molar enthalpies of formation or combuation?(like table 17.2 or the one you received from me)

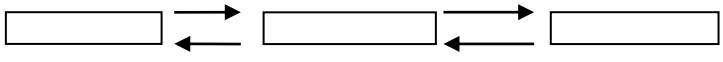
When do you use table 17.3?

Hess' Law-
(put into words)

What two things do you need to remember to do with Hess's Law questions?
1-

2-

Fill in the following including exo or endo.



Total energy change is: Formula for ΔH=

Endothermic enthalpy = + or - ? Exothermic enthalpy change =

Energy per mol is found from an equation by:

$\Delta H = \Sigma - \Sigma$

To do calculation involving calorimetry and Heat or production

1- Find_____ first.

2- Find the energy for the quantity by:

3- Use $\Delta H = q$ if necessary(when the energy is being used to heat something up.

Do p 535 #41, 46, 47, 48, 54 to 60, p 536 69c p 537 81

Do the following:

Problems

1. Calculate the total energy change of 500. g of Al (liquid) solidifying from 95°C to 23°C. The molar enthalpy of solidification of aluminum is 10.67 kJ/mol. The specific heat of liquid aluminum is 1.09 J/g°C and that of solid aluminum is 0.897 J/g°C.
2. 750 g of ammonium nitrate is dissolved in 650 ml of water. This causes the temperature to drop from 25.6°C to 1.02°C. What is the molar enthalpy of ammonium nitrate?
3. Determine the heat required to convert 62.0 g of ice at -10.3°C to water at 0.0°C. Include a heating curve.
4. The molar enthalpy for the combustion of octane is -1.3 MJ/mol. Write a balanced equation to communicate enthalpy in the reaction.
5. You have a sample of water with a mass of 23.0 grams at a temperature of -46.0°C.
   How many kJ of energy are required to carry out each step?
   A) heat the ice to 0.0°C?
   B) melt the ice?
   C) heat the water from 0.0°C to 100.0°C?
   D) boil the water?
   E) heat the steam from 100.0°C to 109.0°C?
   F) Draw a heating curve to show A to E.
   G) find the total energy required.
6. Use the following information to answer this question.

$C(s) + 2H_2(g) \text{ -----> } CH_4(g)$ $\Delta H = -74.8$ kJ

$C(s) + 2Cl_2(g) \text{ ------> } CCl_4(l)$ $\Delta H = -106.4$ kJ

$^1/_2H_2(g) + {}^1/_2Cl_2(g) \text{ -----> } HCl(g)$ $\Delta H = -92.3$ kJ

Find $CH_4(g) + 4Cl_2(g) \text{ -----> } CCl_4(l) + 4HCl(g)$ ΔH=?

7. Given the following thermochemical data:

1) $C_2H_2(g) + {}^5/_2O_2(g) \text{ -----> } 2CO_2(g) + H_2O(l)$ $\Delta H = -1.30 \times 10^3$ kJ

2) $C_2H_6(g) + {}^7/_2O_2(g) \text{ -----> } 2CO_2(g) + 3H_2O(l)$ $\Delta H = -1.56 \times 10^3$ kJ

3) $H_2(g) + {}^1/_2O_2(g) \text{ -----> } H_2O(l)$ $\Delta H = -2.86 \times 10^2$ kJ

FIND: $C_2H_2(g) + 2H_2(g) \text{ -----> } C_2H_6(g)$ ΔH = ?

8. Draw a potential energy diagram for the following reaction... $D_2 + B_2 + 568$ kJ $\rightarrow$ 2DB

Label the following on your graph: A. Reactants B. Products C. Change in enthalpy

9. Use the table of enthalpies of formation to find ΔH for $2C_8H_{18}(g) + 25\ O_2(g) \rightarrow 16\ CO_2(g) + 18\ H_2O(g)$

9. What mass of propane must be burned to heat 5.0 L of water from 10°C to 80°C?